

WHAT IS CLAIMED IS:

1. A pointing system comprising:
an encoded surface; and
a pointing device for use with the encoded surface wherein said device is remote from said encoded surface during pointing, said pointing device comprising:
 - 5 a collimated light source for projecting a collimated light beam having a wavelength outside the visible light spectrum onto said encoded surface, said encoded surface scattering the collimated light beam striking said encoded surface;
 - a detector associated with the collimated light source for detecting at least a portion of said scattered light; and
 - 10 a controller associated with the detector and configured to respond to the detected portion of the scattered light to determine a position where the collimated light beam strikes the encoded surface, said position corresponding to where the device is pointing.
2. A pointing system as set forth in claim 1 wherein the collimated light beam comprises infrared light.
3. A pointing system as set forth in claim 2 wherein said collimated light source is one of a resonant cavity light-emitting diode (RC-LED), a Vertical Cavity Surface-Emitting Laser (VCSEL), and an Edge Emitting Laser-Diode (EELD).
4. A pointing system as set forth in claim 2 wherein said encoded surface scatters only infrared light.
5. A pointing system as set forth in claim 2 wherein said encoded surface comprises at least one scattering feature that substantially scatters infrared light and at least one non-scattering feature that does not substantially scatter infrared light.
6. A pointing system as set forth in claim 5 wherein said at least one scattering feature and said at least one non-scattering feature cooperate to create a pattern on said encoded surface.

7. A pointing system as set forth in claim 5 wherein said at least one scattering feature is an infrared coating.

8. A pointing system as set forth in claim 1 wherein said encoded surface is visible-light transparent.

9. A pointing system as set forth in claim 8 wherein said encoded surface is mountable on another surface.

10. A pointing system as set forth in claim 1 wherein said device is at least 15 centimeters (6 inches) from said encoded surface.

11. A pointing system as set forth in claim 10 wherein said device is at least 90 centimeters (3 feet) from said encoded surface.

12. A pointing system as set forth in claim 1 wherein said position on said encoded surface is a relative position,

wherein said controller responds to the detected portion of the scattered light to determine any relative movement of the position where the collimated light beam strikes the encoded surface, which corresponds to any relative movement of where the device is pointing.

13. A pointing system as set forth in claim 1 wherein said position on said encoded surface is an absolute position corresponding to a location on said encoded surface.

14. A pointing system as set forth in claim 1 wherein said device further comprises a filter for substantially filtering out light of a wavelength irrelevant to said detected portion of scattered light, thereby prohibiting said filtered out light from striking said detector.

15. A pointing system as set forth in claim 1 wherein said encoded surface is encoded with a digital pattern and wherein said controller is configured to determine position as a function of the digital pattern.

16. A pointing system as set forth in claim 1 wherein said encoded surface is incorporated into a display.

17. A pointing system as set forth in claim 16 wherein said controller signals the display to display an image corresponding to the position where the collimated light beam strikes the encoded surface.

18. A pointing system as set forth in claim 17 wherein said device further comprises a position adjustment mechanism for manually adjusting the location of the image on the display.

19. A pointing system as set forth in claim 18 wherein said position adjustment mechanism is one of a trackball and a touchpad.

20. A pointing system as set forth in claim 1 wherein said encoded surface includes an area of at least 0.13 square meters (200 square inches).

21. A pointing system as set forth in claim 1 wherein said detector is a photodetector.

22. A pointing system as set forth in claim 21 wherein said photodetector comprises at least four elements for detecting at least a portion of said scattered light.

23. A pointing system as set forth in claim 1 wherein said device further comprises a visible light source for projecting a visible light beam onto said encoded surface in substantially the same position on the encoded surface where the collimated light beam strikes the encoded surface.

24. A pointing system as set forth in claim 1 further comprising
a second collimated light source for projecting a second collimated light beam onto said encoded surface, said encoded surface scattering the second collimated light beam striking said encoded surface; and

5 a second detector associated with the second collimated light source for detecting at least a portion of said scattered light.

25. A pointing device for use with an encoded surface, wherein said device is remote from said encoded surface during pointing, said pointing device comprising:

a collimated light source for projecting a collimated light beam having a wavelength outside the visible light spectrum onto said encoded surface, said encoded
5 surface scattering the collimated light beam striking said encoded surface;

a detector associated with the collimated light source for detecting at least a portion of said scattered light;

a housing, said collimated light source and said detector mounted on said housing;
and

10 a controller associated with the detector and configured to respond to the detected portion of the scattered light to determine a position where the collimated light beam strikes the encoded surface, said location corresponding to where the device is pointing.

26. A pointing device as set forth in claim 25 wherein the collimated light beam comprises infrared light.

27. A pointing device as set forth in claim 26 wherein said collimated light source is one of a resonant cavity light-emitting diode (RC-LED), a Vertical Cavity Surface-Emitting Laser (VCSEL), and an Edge Emitting Laser-Diode (EELD).

28. A pointing device as set forth in claim 25 wherein said device further comprises a filter for substantially filtering out light of a wavelength irrelevant to said detected portion of scattered light, thereby prohibiting said filtered out light from striking said detector.

29. A pointing device as set forth in claim 25 wherein said encoded surface is encoded with a digital pattern and wherein said controller is configured to determine position as a function of the digital pattern.

30. A pointing device as set forth in claim 25 wherein said encoded surface is incorporated into a display,
wherein said controller signals the display to display an image corresponding to the position where the collimated light beam strikes the encoded surface.

31. A pointing device as set forth in claim 30 wherein said device further comprises a position adjustment mechanism for manually adjusting the location of the image on the display.

32. A pointing device as set forth in claim 31 wherein said position adjustment mechanism is one of a trackball and a touchpad.

33. A pointing device as set forth in claim 25 wherein said device further comprises a visible light source for projecting a visible light beam onto said encoded surface in substantially the same position on the encoded surface where the collimated light beam strikes the encoded surface.

34. A pointing device as set forth in claim 25 further comprising
a second collimated light source for projecting a second collimated light beam
onto said encoded surface, said encoded surface scattering the second collimated light
beam striking said encoded surface; and

5 a second detector associated with the second collimated light source for detecting
at least a portion of said scattered light.

35. A pointing device as set forth in claim 25 wherein said position on said
encoded surface is a relative position,

wherein said controller responds to the detected portion of the scattered light to
determine any relative movement of the position where the collimated light beam strikes
5 the encoded surface, which corresponds to any relative movement of where the device is
pointing.

36. A pointing device as set forth in claim 25 wherein said position on said
encoded surface is an absolute position corresponding to a location on said encoded
surface.

37. A pointing device as set forth in claim 25 wherein said detector is a
photodetector.

38. A method for determining a position where a collimated light beam of a
pointing device strikes an encoded surface remote from said pointing device, said
position corresponding to where the device is pointing, said method comprising:

projecting the collimated light beam having a wavelength outside the visible light
5 spectrum from the pointing device onto the encoded surface, said encoded surface having
light-scattering properties for scattering the collimated light beam,

detecting at least a portion of the light scattered by the encoded surface, and
determining the position where the collimated light beam strikes the encoded
surface, which corresponds to where the device is pointing, as a function of a

10 characteristic of said detected scattered light.

39. A method as set forth in claim 38 further comprising utilizing said position information to display an image on a display associated with said encoded surface, said image corresponding to the position where the collimated light beam strikes the encoded surface.

40. A method as set forth in claim 38 further comprising utilizing said position information to execute a command on a computer associated with said pointing device, said command corresponding to an item on a display associated with said encoded surface, said item corresponding to the position where the collimated light beam strikes
5 the encoded surface.